REPLACEMENT SHEET
Inventor(s): Axel Susen et al.
U.S. Serial No.: 09/786,819
Filing Date: July 9, 2002
Atty. Dkt. No.: 2345/147
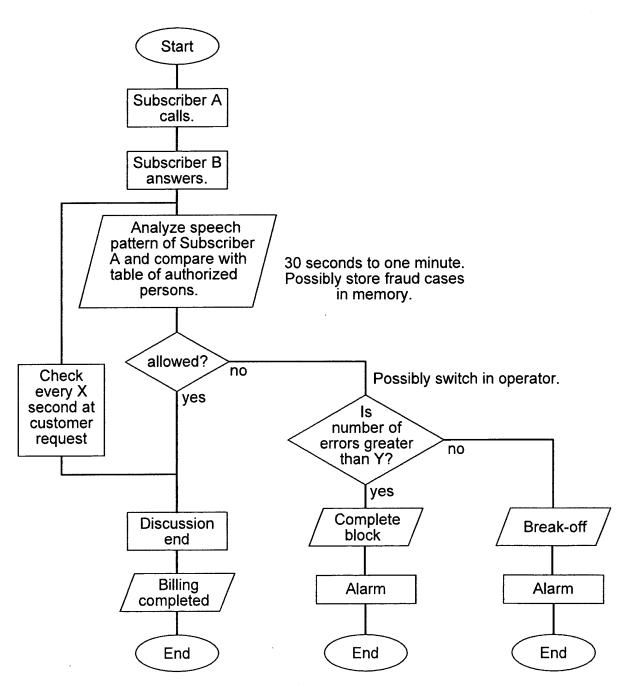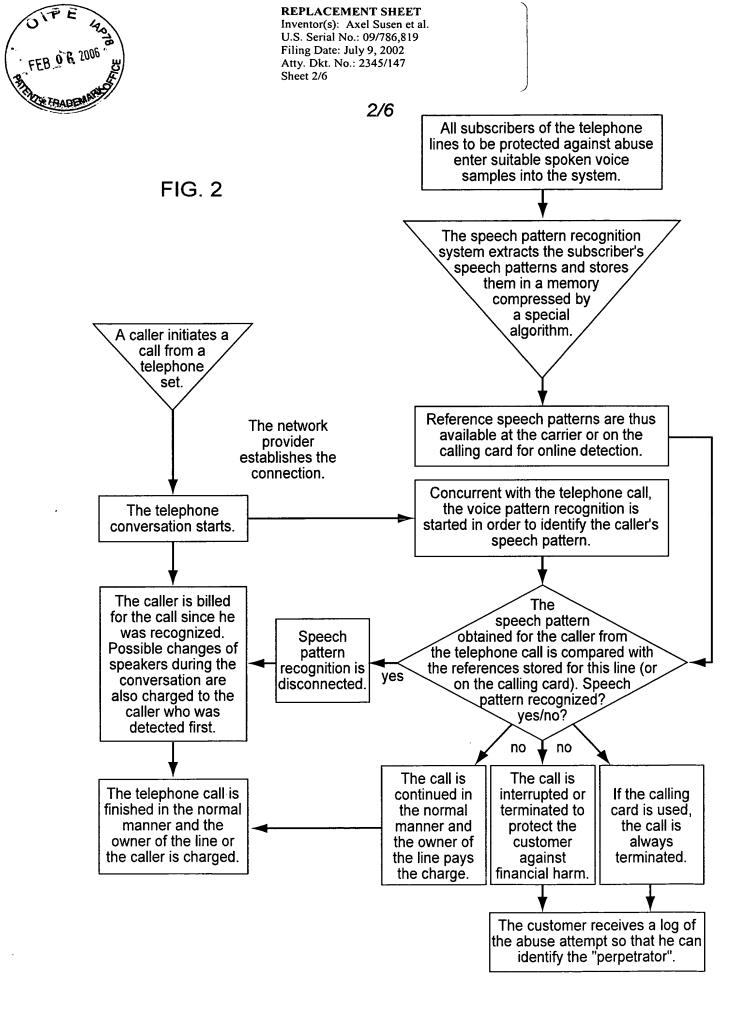Sheet 1/6

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```
                    ┌──────────┐
                    │  Start   │
                    └──────────┘
                         │
                 ┌───────────────┐
                 │ Subscriber A  │
                 │    calls.     │
                 └───────────────┘
                         │
                 ┌───────────────┐
                 │ Subscriber B  │
                 │   answers.    │
                 └───────────────┘
                         │
            ┌────────────────────────┐
            │ Analyze speech          │    30 seconds to one minute.
            │ pattern of Subscriber   │    Possibly store fraud cases
            │ A and compare with      │          in memory.
            │ table of authorized     │
            │ persons.                │
            └────────────────────────┘
                         │
                    ◇ allowed? ◇──── no
                         │ yes
```

Check every X second at customer request

Possibly switch in operator.

Is number of errors greater than Y? — no

Discussion end

yes

Complete block

Break-off

Billing completed

Alarm

Alarm

End

End

End

FIG. 1

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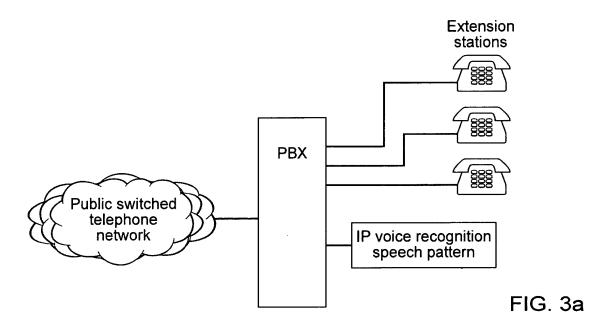Filing Date: July 9, 2002
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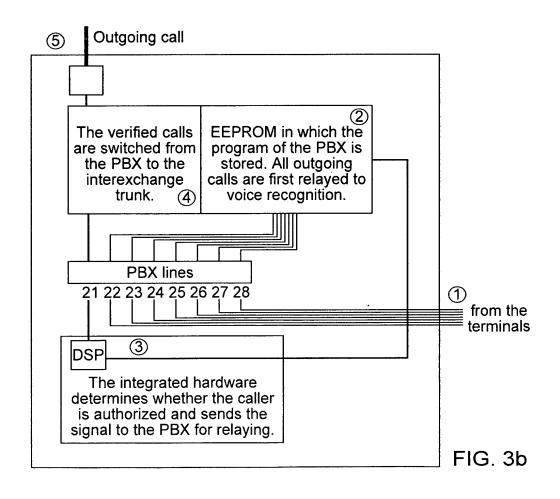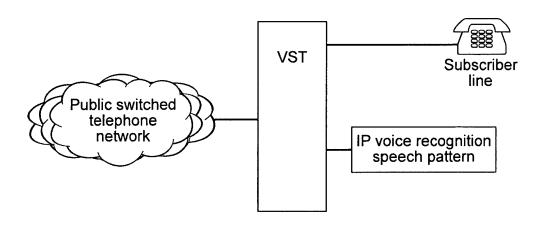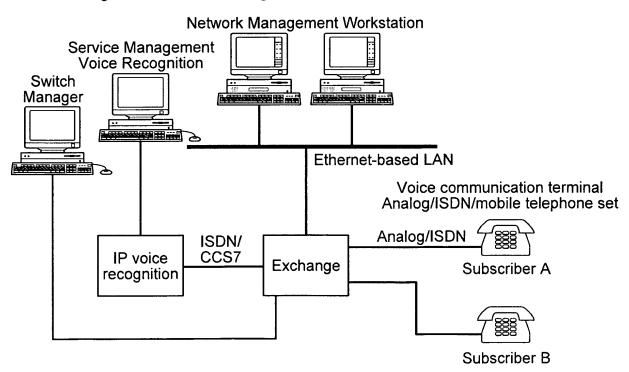## FIG. 2

All subscribers of the telephone lines to be protected against abuse enter suitable spoken voice samples into the system.

The speech pattern recognition system extracts the subscriber's speech patterns and stores them in a memory compressed by a special algorithm.

A caller initiates a call from a telephone set.

The network provider establishes the connection.

Reference speech patterns are thus available at the carrier or on the calling card for online detection.

The telephone conversation starts.

Concurrent with the telephone call, the voice pattern recognition is started in order to identify the caller's speech pattern.

The caller is billed for the call since he was recognized. Possible changes of speakers during the conversation are also charged to the caller who was detected first.

Speech pattern recognition is disconnected.

yes

The speech pattern obtained for the caller from the telephone call is compared with the references stored for this line (or on the calling card). Speech pattern recognized? yes/no?

no   no

The telephone call is finished in the normal manner and the owner of the line or the caller is charged.

The call is continued in the normal manner and the owner of the line pays the charge.

The call is interrupted or terminated to protect the customer against financial harm.

If the calling card is used, the call is always terminated.

The customer receives a log of the abuse attempt so that he can identify the "perpetrator".

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Extension
stations

PBX

Public switched
telephone
network

IP voice recognition
speech pattern

FIG. 3a

⑤ Outgoing call

The verified calls
are switched from
the PBX to the
interexchange
trunk. ④

EEPROM in which the ②
program of the PBX is
stored. All outgoing
calls are first relayed to
voice recognition.

PBX lines

21 22 23 24 25 26 27 28

① from the
terminals

DSP ③

The integrated hardware
determines whether the caller
is authorized and sends the
signal to the PBX for relaying.

FIG. 3b

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VST

Subscriber
line

Public switched
telephone
network

IP voice recognition
speech pattern

FIG. 4a

Implementation example:
voice recognition in an exchange

Network Management Workstation

Service Management
Voice Recognition

Switch
Manager

Ethernet-based LAN

Voice communication terminal
Analog/ISDN/mobile telephone set

IP voice
recognition

ISDN/
CCS7

Exchange

Analog/ISDN

Subscriber A

Subscriber B

FIG. 4b

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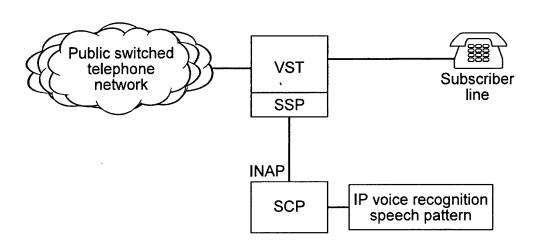Filing Date: July 9, 2002
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Switching matrix

Subscriber card ← Subscriber A

IP (DSP) ↔ CPU
Control of the
exchange

Subscriber card → Subscriber B

Switching matrix

FIG. 4c

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FIG. 5